

**PATENT COOPERATION TREATY**  
**PCT**  
**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**  
(Chapter II of the Patent Cooperation Treaty)  
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>FP20607</b>	<b>FOR FURTHER ACTION</b>		See Form PCT/IPEA/416
International application No. <b>PCT/AU2004/001458</b>	International filing date ( <i>day/month/year</i> ) <b>22 October 2004</b>	Priority date ( <i>day/month/year</i> ) <b>22 October 2003</b>	
International Patent Classification (IPC) or national classification and IPC  <b>Int. Cl.<sup>7</sup> C01F 7/46; B01J 19/10</b>			
Applicant  <b>COMALCO ALUMINIUM LIMITED et al</b>			

  

1.	This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2.	This REPORT consists of a total of <b>4</b> sheets, including this cover sheet.
3.	This report is also accompanied by ANNEXES, comprising: <div style="margin-left: 20px;"> a. <input type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of     sheets, as follows: <div style="margin-left: 20px;"> <input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).   <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. </div> </div> <div style="margin-left: 20px;"> b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s))     , containing a sequence listing and/or table related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions). </div>
4.	This report contains indications relating to the following items: <div style="margin-left: 20px;"> <input checked="" type="checkbox"/> Box No. I     Basis of the report   <input type="checkbox"/> Box No. II     Priority   <input type="checkbox"/> Box No. III     Non-establishment of opinion with regard to novelty, inventive step and industrial applicability   <input type="checkbox"/> Box No. IV     Lack of unity of invention   <input checked="" type="checkbox"/> Box No. V     Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement   <input type="checkbox"/> Box No. VI     Certain documents cited   <input type="checkbox"/> Box No. VII     Certain defects in the international application   <input type="checkbox"/> Box No. VIII     Certain observations on the international application </div>

  

Date of submission of the demand <b>27 April 2005</b>	Date of completion of the report <b>23 September 2005</b>
Name and mailing address of the IPEA/AU  <b>AUSTRALIAN PATENT OFFICE</b> <b>PO BOX 200, WODEN ACT 2606, AUSTRALIA</b> E-mail address: <b>pct@ipaaustralia.gov.au</b> Facsimile No. <b>(02) 6285 3929</b>	Authorized Officer  <b>WARREN TAYLOR</b> Telephone No. <b>(02) 6283 2229</b>

**Box No. I**      **Basis of the report**

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1 (b))
- ☐ publication of the international application (under Rule 12.4)
- ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

☐ the international application as originally filed/furnished

☐ the description:

pages as originally filed/furnished

pages\* received by this Authority on with the letter of

pages\* received by this Authority on with the letter of

☐ the claims:

pages as originally filed/furnished

pages\* as amended (together with any statement) under Article 19

pages\* received by this Authority on with the letter of

pages\* received by this Authority on with the letter of

☐ the drawings:

pages as originally filed/furnished

pages\* received by this Authority on with the letter of

pages\* received by this Authority on with the letter of

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to the sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to the sequence listing (*specify*):

\* If item 4 applies, some or all of those sheets may be marked "superseded."

**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

Novelty (N)	Claims 1-20	YES
	Claims	NO
Inventive step (IS)	Claims 1-20	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-20	YES
	Claims	NO

**2. Citations and explanations (Rule 70.7)**

The current application is directed to a process step that procures the destruction of organic compounds, via an ultrasonic treatment of crude alumina, in refining a purer alumina from alumina process feed stocks.

The problem to solve appears to reside in the removal of harmful organic compounds from liquors, crude alumina particles and collector materials involved in said alumina processes.

The following documents appear most relevant to the presently claimed invention;

D1 – US 4062696

D2 – CN 1072214

D3 – US 6335396

D4 – WO 1989/005184

Documents D3-D4 discloses removing harmful organic material (humates) from alumina slurries in order to purify the resultant alumina during Bayer processes. Neither of these documents utilise ultrasonic destruction of said organics to effect this purification.

D2 is directed to the purification of antimony oxide through ultrasonic destruction of organic or inorganic material bound thereon. D2 does not disclose a purification of alumina by said process.

D1 is directed to the removal of metallic and non-metallic impurities from contaminated alumina scavengers in alumina refinery processes. Contaminated alumina slurry is subjected to ultrasonic treatment in order to remove said impurities. As far as can be understood from the disclosure of D1, this treatment applies to the Hall-Heroult alumina refinery process and not specifically the Bayer process.

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Box V

**NOVELTY (N) Claims 1-20**

Independent claim 1 defines the removal of unwanted organic material from the Bayer process, through ultrasonic treatment of Bayer liquors, precipitated aluminium trihydrate particles and any other solids added or produced by said process in order to purify the resultant alumina. There is no disclosure in D1-D4 to removal of organics – particularly humates – in Bayer process liquors or aluminium trihydrate particles, via an ultrasonic treatment. Therefore it is considered the disclosures of D1-D4 do not deprive the present claims of novelty.

**INVENTIVE STEP (IS) Claims 1-20**

None of D1-D4 singularly, nor in combination any of documents D1-D4, disclose all the features of the present claims. It is therefore considered the present claims involve an inventive step in light of D1-D4 also.

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/AU2004/001458

## A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. <sup>7</sup>: C01F 7/46; B01J 19/10

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B01J 19/10; C01F 7/36, 7/46; C07F 5/06; C22B 21/06, 21/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPAT; JAPIO; CAPLUS; USPTO; Espace@net; IPC above and Keywords - Bayer, ultraso+, sound+, purity, purific+, alumin+

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4062696 A (DUCOTE), 13 December 1977 Whole document	1-20
A	CN 1072214 (UNIVERSITY OF ZHONGNAN POLYTECHNIC) 19 May 1993 (abstract). [online] [retrieved on 2004-12-06]. Retrieved from Espace@net.	1
A	US 6335396 B1 (CHEVALLIER et al), 1 January 2002	1
A	WO 1989/005184 A (LAIHO K.U.), 15 June 1989	1



Further documents are listed in the continuation of Box C



See patent family annex

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

10 December 2004

Date of mailing of the international search report

20 DEC 2004

Name and mailing address of the ISA/AU

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/AU2004/001458**

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member			
US	4062696				
CN	1072214				
US	6335396	AU	43667/97	AU	78163/94
		CA	2150369	CN	1114832
		FI	952605	FR	2710629
		US	6169135	WO	9509127
WO	8905184	DK	339689	EP	0344262
		NO	892705	US	5053141
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.					
END OF ANNEX					